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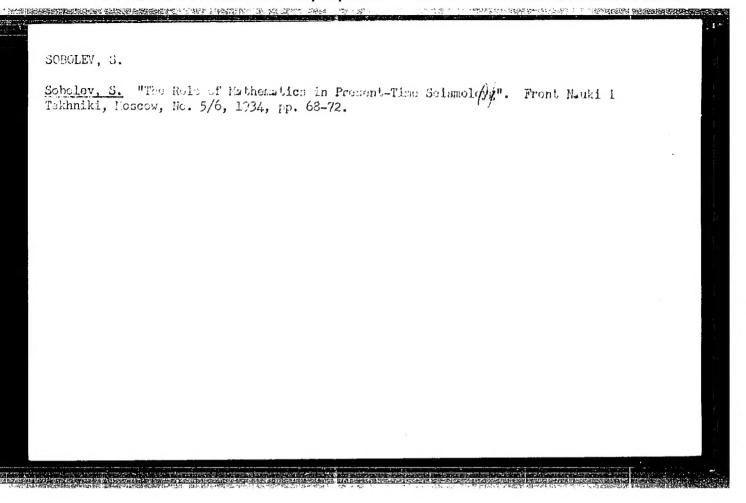
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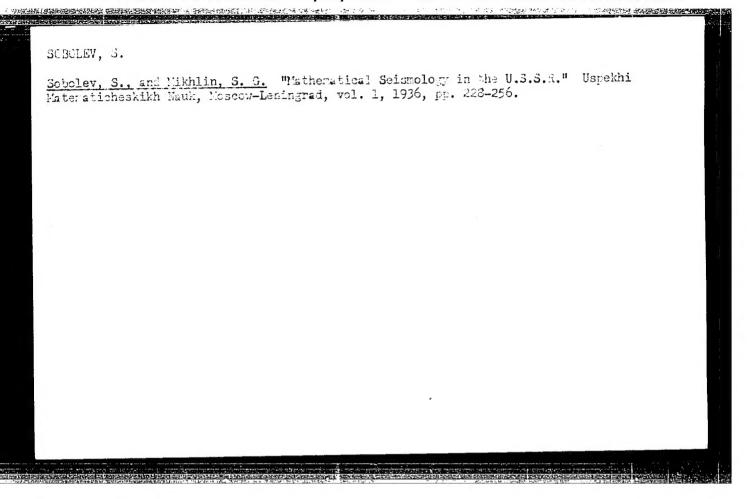
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## SOBOLEV, S.L

Soboleff, S. L. Sur la presque périodicité des solutions de Péquation des ondes. I. C. R. (Doklady) Acad. Sci. URSS (N.S.) 48, 542-545 (1945). [MF 16645] Soboleff, S. L. Sur la presque périodicité des solutions de l'équation des ondes. II. C. R. (Doklady) Acad. Sci. URSS (N.S.) 48, 618-620 (1945). [MF 16640] Soboleff, S. L. Sur la presque périodicité des solutions de l'équation des ondes. III. C. R. (Doklady) Acad. Sci. URSS (N.S.) 49, 12-15 (1945). [MF 16638]

After a theorem of Muckenhoupt for n=1 [J. Math. Phys. Mass. Inst. Tech. 8, 163–199 (1929)] it was proved by the reviewer [Acta Math. 62, 227–237 (1934)] that a solution  $u=u(x_1, \dots, x_n; t)$  of the wave equation  $(*) \Delta u - \partial^2 u/\partial t^2 = 0$ , if compact as a function of t, is automatically almost periodic in t. The operator  $\Delta u$  in this statement is a fairly general elliptic operator over a suitable Hilbert space of functions of  $(x_1, \dots, x_n)$  in a domain; the "compactness" and "almost periodicity" refer to the function u(x;t) as an abstract-valued function in t whose values are elements of the Hilbert space. In a paper by the reviewer and von Neumann [Ann. of Math. (2) 36, 255–291 (1935)] this was generalized to solutions of more general equations which are linear in t.

In the present notes the author is concerned in the case of equations (\*) with drawing up assumptions under which the prerequisite compactness will be verified in order to be able to draw the conclusion that the trajectories are almost periodic (in the average). In note 1 he proves this compact-

Source: Eathematical Reviews,

ness for the ordinary Laplacian simply under the alternate boundary conditions  $u|_{s}=0$  or  $\partial u/\partial n|_{s}=0$  with certain smoothness requirements on the boundary and differentiability conditions on u(x; t). He obtains this conclusion by utilizing, in addition to the familiar energy integral  $\int (\sum (\partial u/\partial x_i)^2 + u^2) d\Omega$ , which had been the only one used before, a new type of energy integral which involves partial derivatives of the second order, and whose constancy permits the conclusion (partly based on results of W. Kondrachov) that the partial derivatives of the first order in x are also compact. It is unlikely that the integral has not been noticed before, but its use in this type of problem seems to be novel.

In note II the author generalizes his conclusions from the Laplacian in rectilinear coordinates to one in curvilinear coordinates. In note III he returns again to the classical operator  $\square u = \sum (\partial^2 u/\partial x_i^2) - \partial^2 u/\partial t^2$ ; however, he admits "generalized" solutions of  $\square u = 0$  for which no partial derivatives in x need exist. Such generalized solutions are defined by the adjoint equation  $(u, \square \phi) = 0$ , in which  $\phi$  belongs to a large class of differentiable functions. The author proves again that the boundary condition  $u|_{s}=0$  insures compactness and thus almost periodicity of the trajectory. The latter type of "generalized" solution by means of adjoint equations has also been treated in the meantime by the reviewer [Ann. of Math. (2) 47, 202-212 (1946); these Rev. 7, 446].

Vol 8, No. 2

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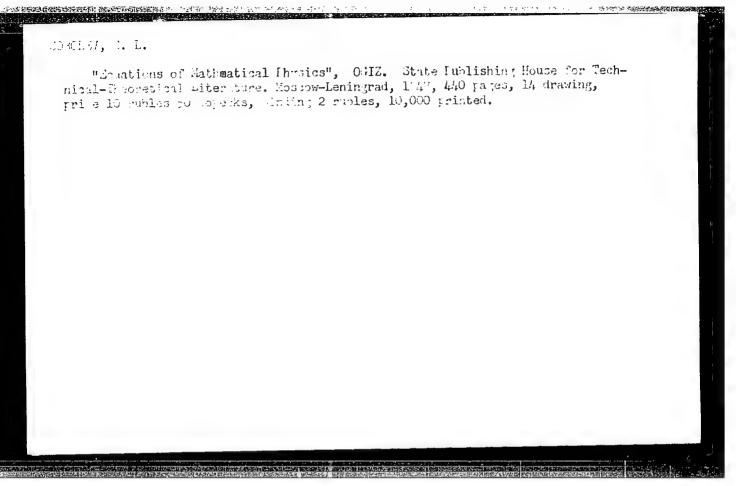
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A:ad. of Sci.



SOHOLKY, S.L., akad.; FINITERGOL'TS, G.M., prof.

Academician V.I. Smirnov. Vest. IGU 2 no.6:155-157 Je '47.

(MIRA 12:9)

(Smirnov, Vladimir Ivanovich, 1887-)

PA 50T50

SOBOLEV, S.L.

USSR/Mathematics - Biography

Nov/Dec 1947

"Vladimir Ivanovich Smirnov," S. L. Sobolev, 2 pp

"Uspekhi Matematicheskikh Nauk" Vol II, No 6 (22)

Brief biography of V. I. Smirnov written in honor of his 60th birthday and the 35th anniversary of his scientific endeavor. At present, professor at Lemingrad State University, has written many articles on complex variables. On his 60th birthday is in excellent health, and can be expected to contribute many more productive years to the service of mathematics.

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### "APPROVED FOR RELEASE: 08/25/2000

### CIA-RDP86-00513R001651820017-0

Sobolev, S.L.

PA21T56

Jan 1947

USSR/Mathematics - Calculations Mathematics, Applied

"The K-membered Tables of Functions of Three Variables, Shown as the Sum of the Products of Functions of One Variable," L Ya Neyshuler, 4 pp

"Dok Ak Nauk SSSR" Vol LV, No 3

Submitted by S L Sobolev 27 Jul 46. Mathematically expounds the statement that calculated formulae (containing three factors), are met in practicable calculations, most frequently shown as the sum of the products of the function, each from one variable, or the function from such a sum.

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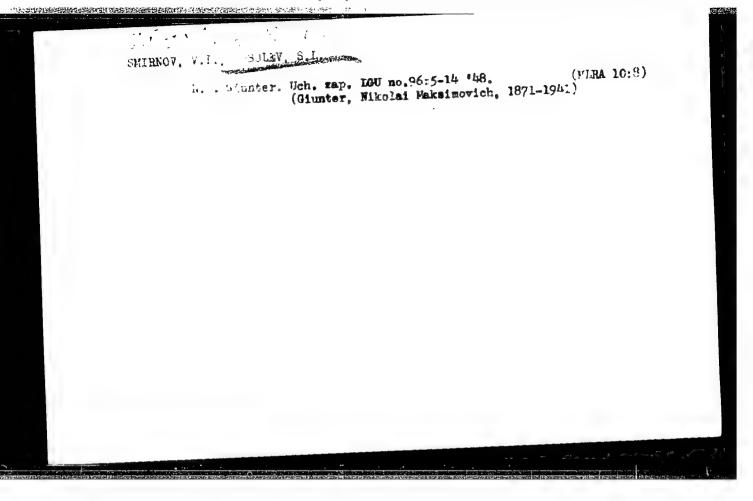
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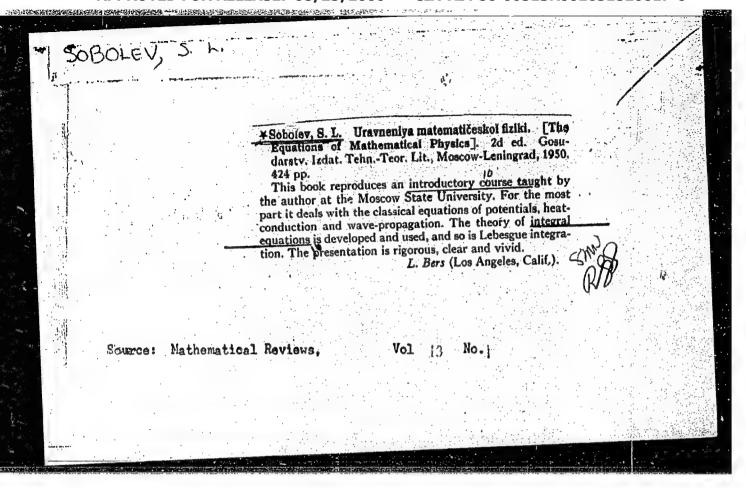


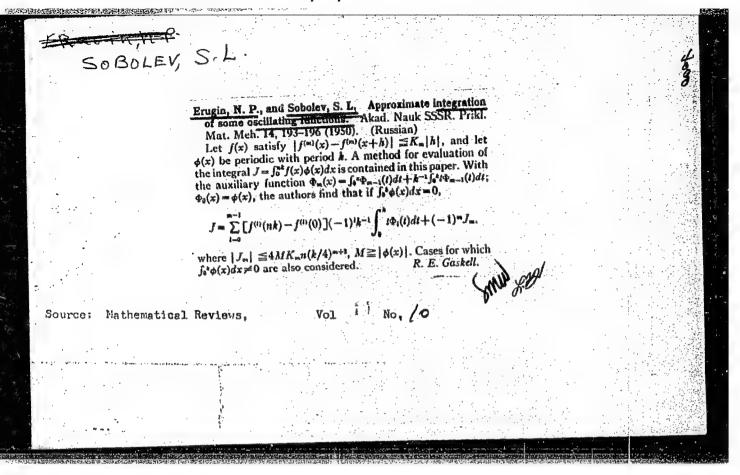
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\*Sobolev, S. L. Nekotorye primeneniya funkcional'nogo analiza v matematičeskoi fizike. [Some applications of functional analysis in mathematical physics.] Izdat. Leningrad. Gos. Univ., Leningrad, 1950. 255 pp. 16 rubles.

Chap. I, Special questions of functional analysis: Introduction; Fundamental properties of spaces  $L_p$ ; Linear functionals in  $L_p$ ; Compactness of spaces; Generalized derivatives; Properties of integrals of the type of a potential; Spaces  $L_p^{(0)}$  and  $W_p^{(0)}$ ; Embedding theorems; General methods of norming  $W_p^{(0)}$  and consequences of an embedding theorem; Some consequences of embedding theorems; Complete continuity of the embedding operator (theorem of Kondrašev). Chap. II, Variational methods in mathematical physics: Dîrichlet's problem; Neumann's problem; Polyharmonic equation; Uniqueness of solution of a fundamental boundary problem for the polyharmonic equation; Problem of characteristic values. Chap. III, Theory of hyperbolic differential equations: Solution of the wave equation with smooth initial conditions; Generalized Cauchy problem for the wave equation; Linear equation of normal hyperbolic type with variable coefficients (basic properties); Cauchy's problem for linear equations with smooth coefficients; Investigatica of linear hyperbolic equations with variable coeffi-Table of contents. cients; Quasi-linear equations.

30: Mathematical "eview Vol. 14, No. 6, pp 523-608, 1953.





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	ì	(Russian)	, no. 2(42), 185-19	0 (1 plate) (1951)	•	
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	Sobolev, S. L. On the fiftleth birthday of Ivan Georgievič  Petryskii. Izvestiya Akad. Nauk SSSR. Scr. Mat. 15, 201-204 (I plate) (1951). (Russian)  A list of Petrovskii's published papers is included.
Source	Mathematical Reviews. Vol 13 No.1

SOBOLEV, S.L.

# USSR/Mathematics - Partial Differential 21 Dec 51 Equations

"A New Problem for Systems of Partial Differential Equations," Acad S. L. Sobolev, Math Inst imeni Steklov, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXXI, No 6, pp 1007-1009

Indicates a system of partial differential eqs which is not a system of Kovalevskaya, for which not only Cauchy's problem but also the mixed problem in an arbitrary smooth region stays rational. Submitted 31 Oct 51.

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1. JOBNIEW, 3. 5.

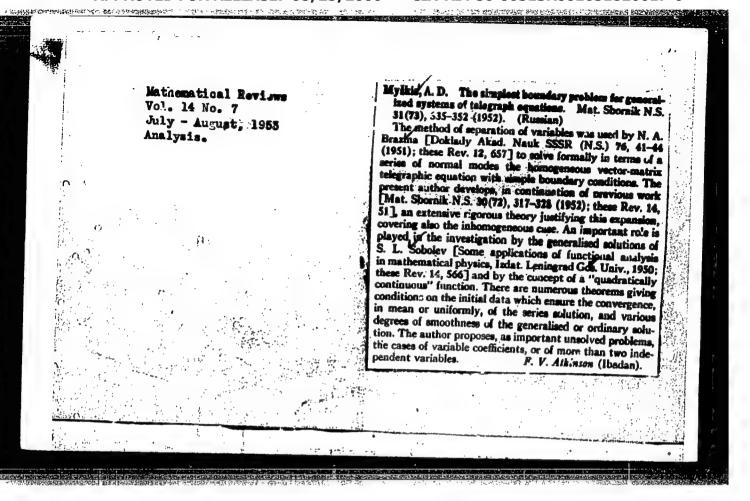
2. USSR (600)

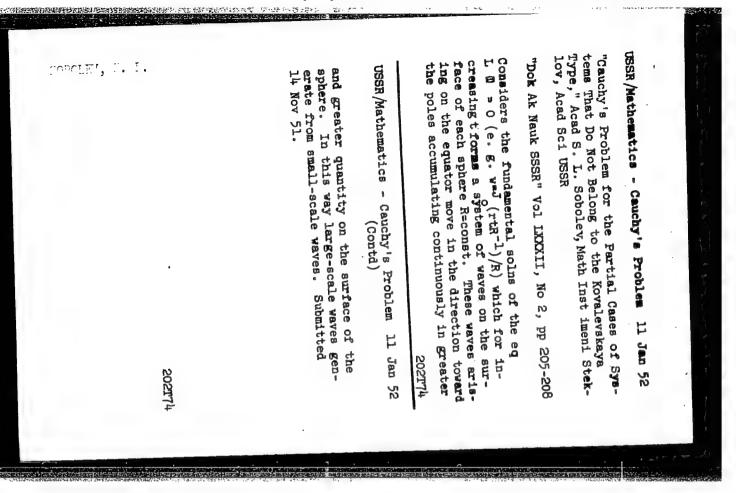
Mathematics - Bessions

Jan/Feb 52

"A New Problem of Mathematical Physics", Report at "Five Sessions of the Moscow Mathematical Society, Sept, and Oct. 1951". Uspekh Matemat Nauk" Vol. 7, No.1, (47), pp 130-150.

9. PA 204T26





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### CIA-RDP86-00513R001651820017-0

SOBOLEV, S.		8 U		4- ,n\$1:	<del>1</del> 7		PA 245T74	<b>4</b> Δ	
	II Nov 52	of Difference Equations cad S. L. Sobolev, Math Sci USSR	2, pp 179-182	ition of the follow Um+l,n-l - Um-l,n+l.	ተይመሪካሪ	ates that solution of this to infinity slower than to a constant. Submitted		47174	The second of th
	USSR/Wathematics - Difference Equation	"Uniqueness of Solution of Difference Equations of the Elliptic Type," Acad S. L. Sobolev, Math Inst imeni Steklov, Acad Sci USSR	"Dok Ak Nauk SSSR" Vol 87, No 2, pp 179-182	Considers the difference equation of the following type:  4I.um,n = um+1,n+1 = um-1,n-1 = um+1,n-1 = um-1,  4I.um,n = 0 for all values of m,n over the		xy-plane. Demonstrates that equation increases to infinit $(\mathbf{m}^2 \not\models^{\mathbb{Z}})_{\frac{1}{2}}$ and tends to a constant Sep 52.			The state of the s

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SOBOLOV, S. L.

USSR/Mathematics - Difference Equation 21 Dec 52

"A Difference Equation," Acad S. L. Sobolov, Math Instimeni Steklov, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol 87, No 3, pp 341-343

Considers the following difference equation.  $w_{m+1,n+1} - w_{m-1,n-1} - w_{m+1,n-1} - w_{m-1,n+1}$ 

-  $4w_{m,n}$  = 4 (if  $m^2+1^2=0$ ), or 0 (if  $m^2+n^2>0$ ) for all values of m,n. Constructs the solution of this equation increasing to infinity as  $\ln(m^2+n^2)\frac{1}{2}$ ; also  $w_{00}=0$ . States that such a solution is unique according to author's previous work ("Dok Ak Nauk SSSR" No 2 (1952)). Submitted 24 Sep 52.

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#### CIA-RDP86-00513R001651820017-0 "APPROVED FOR RELEASE: 08/25/2000

SOMELY, O. L.

Jan/Feb 53

USSR/Hathematics - Societies

"Five Woekly Sessions (23 Sep - 21 Oct 52) of the Moscow Mathematical Society"

Usp Hat Nauk, Vol 8, No 1(53), pp 173-175

P. S. Aleksandrov, pres of the Society, urged members to assist in problems announced at the 19th Party Congress. The following reports were made: K. A. Sitnikov at the 19th Party Congress. The following reports were made: K. A. Sitnikov "Possibility of Capture in the Three-body Problem." S. L. Sobolev, "A Difference Equation. "A. N. Kolmogorov "Spectra of Dynamic Systems on a Torus." A. V. Bitsadze, Equation. "A. H. Kolmogorov "Spectra of Dynamic Systems on a forus."A. V. Bitsadze, "The Mixed-type Equation uxx+sgny.ux=0 of M. A. Lavrent'yev." L. N. Sretenskiy, "The Motion of the Goryachev-Chaplytin Gyroscope." I. N. Vekua, "Systems of Elliptic Equations."V. V. Nemytskiy, "Structure of the Spectrum of Monlinear Operator Equations."A. P. Yushkevich, "Fathematics of Central Asian Peoples in the Galacter Contral Asian Peoples in the C 9-15th Centuries." L. S. Sretenskiy vice pres of the Society suggested felicitations for member S. S. Byush ens on his 70th birthday.

PA 250175

PETROVSKIY, I.G.; VOVCHENKO, G.D.; SALISHCHEV, K.A.; SERGEYEV, S.M.;

MOSKVITIN, V.Y.; SRETENSKIY, L.V.; GEL'FOND, A.D.; GOLIDEV, V.V.;

ALEKSANDROV, P.S.; SEBOLEV, S.L.; BAKHVALOV, S.B.; OGUBALOV, P.M.;

KREYERS, M.A.; WYASOLEV, P.V.; ZHIDKOV, M.P.; GAL'FERN, S.A.;

KREYERS, M.A.; WYASOLEV, M.A.

Vsevolod Aleksandrovich Kudriavtsev; obituary. Vest. Mosk.un. 8

(MIRA 7:2)

no.12:129 D '53.

(Kudriavtsev, Vsevolod Aleksandrovich, 1885-1953)

KAMYNIN, L.I.; SOBOLEV, S.L., akademik.

Applicability of the method of finite differences in solving equations for thermal conductivity. Part 2. Izv.AN SSSR. Ser.mat. 17 no.3:249-268 '53. (MLRA 6:5)

1. Akademiya Nauk SSSR (for Sobolev). (Differential equations, Partial) (Heat--Conduction)

- COBOLIW, S.L.
- (00e) EU U
- General presentation of functions of two independent variables, permitting derivatives in S.L. Jobolev's interpretation, and the problem of primitives, I.M. Vekua. Dokl.AM SSSH 89 no. 5, 1953.

\_1953, Uncl. 9. Monthly List of Russian Accessions, Library of Congress, \_ APRIL

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RUBINSHTEYN, L.I.; SOBOLEV, S.L., akademik.

Dynamics of the evaporation of ideal polycomponent fluid mixtures. Dokl.

(MLRA 6:6)

AN SSSR 90 no.6:987-990 Je '53.

1. Turkmenskiy filial Vsesoyuznogo nauchnc -issledovatel'skogo instituta

1. Nebit-Dag (Rubinshteyn). 2. Akademiya Lauk SSSR (for Sobolev).

g. Nebit-Dag (Rubinshteyn). (Evaporation) (Fluids)

BRUDNO, A.L.; SOBOLEV, S.L., akademik.

Norms for Toeplitz fields. Dokl. AN SSSR 91 no.1:11-14 J1 '53.

(MIRA 6:6)

1. Akademiya nauk SSSR (for Sobolev).

(Spaces, Generalized) (Matrixes)

ALEKSANDRIYSKIY, B.I.; SOBOLEV, S.L., akademik.

Theory of certain linear integro-differential systems. Dokl. AN SSSR 91 no. (MLRA 6:6)
2:181-184 J1 '53.

1. Novosibirskiy insheuerno-stroitel'myy institut im. V.V.Kuybysheva. 2. Akademiya nauk SSSR (for Sobolev).

(Differential equations, Linear) (Integral equations)

BRUDNO, A.L.; SOBOLEV, S.L., akademik. Relative norms for Toepli - matrixes. Do'd.AN SSSR 91 no.2:197-200 Jl 153.

(Matrixes) 1. Akademiya nauk SSSR (for Sobolev).

(MLRA 6:6)

CIA-RDP86-00513R001651820017-0" APPROVED FOR RELEASE: 08/25/2000

KIM. Ye.I.; SOBOLEV, S.L., akademik.

One class of an integral equation of the first order with a singular kernel. Dokl.AN SSSR 91 no.2:205-208 J1 '53. (MLRA 6:6)

1. Rostovskiy na Donu gosudarstvennyy pedagogicheskiy institut. 2. Akademiya nauk SSSR (for Sobolev). (Integral equations)

Dynamics of evaporation of polycomponent solutions with non-volatile solvent. Dokl.AN SSSR 91 no.4:2767-769 Ag '53. (MEN 6:8)

1. Akademiya nauk SSSR (for Sobolev), 2. Turkmenskiy filial VNII g. Nehit-Dag.
(Evaporation) (Solution (Chemistry))

ZHENKHEN, O.; SOBOLEV, S.L., akademik.

Existence of solutions for integral-differential equations. Doin.all SSSM 91 (MLRs 5:8) no.5:1261-1262 ag '53.

1. Akademiya nauk SSSR (for Sobolev). 2. Gosudarstvennyy universitet im. Kim Ir Sena Koreya, Fkhen'yan.

(Integral equations) (Differential equations)

VAYNBERG, M.M.; SOBOLEV, S.L., akademik.

Structure of a certain operator. Dokl.AN SSSR 92 no.2:213-216 S '53.

(MIEA 6:9)

1. Akademiya nauk SSSR (for Sobolev).
(Operators (Mathematics)) (Functions of real variables)

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VAYIBERG, M.M.; SOBOLEV, S.L., akademik.

Solvability of certain operational equations. Dokl.aN SSSR 92 no.3:457-460 S '53.

1. Akademiya nauk SSSR (for Sobolev).

(Operators (Nathematics)) (Spaces, Generalized)
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BLINOVA, Ye.N.; SOBOLEV, S.L., akademik.

Pressure determination at sea level. Dokl.AN SSSR 92 no.3:557-560 \$ '53. (MLRA 5:9)

1. Akademiya nauk SSSR (for Sobolev). 2. TSentral'nyy institut prognozov (for Blincva).

TALDYKIN, A.T.; SOBOLEV, S.L., akademik.

Existence of eigenvalues and the completeness of systems of characteristic elements of linear operators. Dokl.AN SSSR 92 no.6:1121-1124 0 '53.

(MLRA 6:10)

1. Akademiya nauk SSSR (for Sobolev).

(Operators (Mathematics))

VISHIK, M.I.; SOBOLEV, S.L., akademik.

First boundary problem for elliptic equations, degenerate at the boundary of the domain. Dokl.AN SSSR 93 no.1:9-12 N '53. (MLRA 6:10)

1. Akademiya nauk SSSR (for Sobolev).

(Differential equations)

VISHIK, M.I.; SOBOLEV, S.L., akademik.

Boundary problems for elliptic equations degenerating at the limit of a domain. Dokl.AN SSSR 93 no.2:225-228 N '53. (MIRA 6:10)

1. Akademiya nauk SSSR (for Sobolev).

(Differential equations)

BRODSKIY, M.L.; SOBOLEV, S.L., akademik.

Asymptotic estimates of errors in numerical integration of systems of ordinary differential equations by methods of differences. Dokl.AN SSSR 93 no.4:599-602 D '53.

1. Akademiya nauk SSSR (for Sobolev).

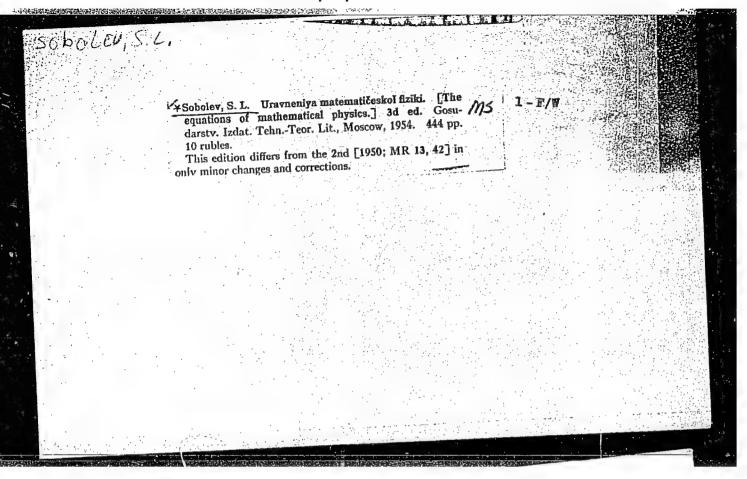
(Differential equations)

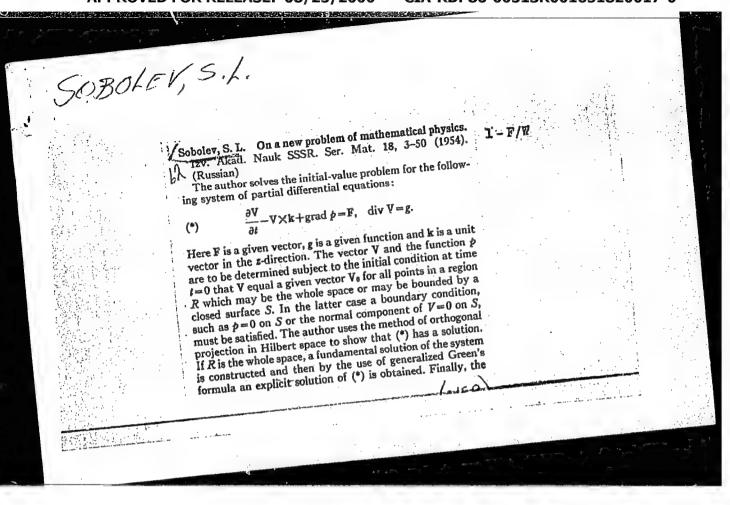
BURDINA, V.I.; SOBOLEV, S.L., akademik.

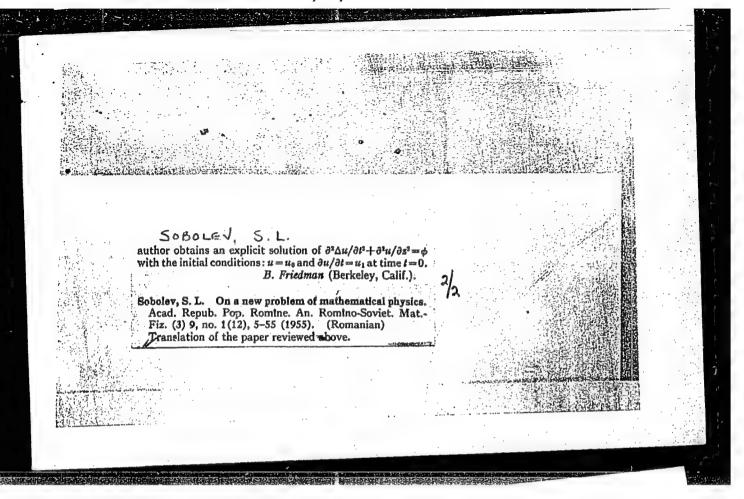
Boundedness of solutions of a system of differential equations. Dokl. AN SSSR 93 no.4:603-606 D 153. (MLRA 6:11)

1. Akademiya nauk SSSR (for Sobolev).

(Differential equations)







Subolev, 5.L.

44-1-9

AUTHORS:

TRANSLATION FROM: Referativnly zhurnal, Matematika, 1957, Nr 1, b 1 (USSR) Sobolev, S.L., Kitov, A.I., Lyapunov, A.A. The Principal Features of Cybernetics (Ocnovny)e cherty kibernetiki)

TITLE: PERIODICAL:

ABSTRACT:

Vopr. Filosofii, 1955, Nr 4, pp 136-148 The article represents the first attempt at a serious study of the scientific content of cybernetics. Cybernetics is defined as a new scientific trend, created by N. Wiener, which is not, however, a sufficiently well-developed and complete scientific discipline. The main divisions of cybernetics, according to the authors, are: (1) information theory; (2) theory of the authors, are: computing machines, as a theory of self-organizing logical processes similar to human thinking; and (3) theory of automatic control systems, which includes the study, from the functional point of view, of the working processes of the nervous system, the sensory organs and other organs of living organisms. Attention is given to the mathematical apparatus of cybernetics, in particular to the study of information, with reference to the work of K. Shannon (collection of translations, "Transmission of Electrical Signals in the Presence of Interference", Moscow, 1953) and A. Ya. Khinchin (Math., 1954, 3771). The necessity of combating foreign reactionary

Card 1/2

20-1-14/54

Imbedding Theorems for Abstract Functions of Sets

point Q. The first of these theorems reads as follows:

 $\mathcal{G}$  (E)  $\in$   $\mathcal{W}_{P}$  and  $\omega$  ( $\vec{Q}$ ,  $\vec{P}$ ) be continuous as functions of point  $\vec{Q}$  in S. Then  $U(\vec{Q})$  is a continuous abstract function of point Q. The concept of the derivation of an abstract function of the sets is also introduced. The proof of the theorems given in this paper is based on the transition to "medium" (averaged?) functions. There are 4 Slavic references, no figures.

ASSOCTATION:

Mathematical Institute im. V. A. Steklov, AN SSSR

(Matematicheskiy institut im. V.A. Steklova Akademii nauk SSSR)

SUBMITTED:

February 22, 1957

AVAILABLE:

Library of Congress

Card 2/2

#### CIA-RDP86-00513R001651820017-0" APPROVED FOR RELEASE: 08/25/2000

20-114-6-9/54

AUTHOR:

Sobolev, S. L., Member of the Academy

TITLE:

The Extensions of Abstract Eunction Spaces Connected With the Theory of the Integral (Rasshireniya prostranstv abstraktnykh

funktsiy, svyazannyye s teoriyey integrala)

Doklady Akademii Nauk SSSR, 1957, Vol. 114, Nr. 6, pp. 1170-1173 (USSR)

PERIODICAL:

ABSTRACT:

The integration of abstract functions is suitably constructed by limiting the integration operator

 $\int \varphi(\vec{P}) dP$ 

(which is defined in the quantity  $\mathfrak M$  of the graduated functions  $\varphi(\vec{P})$  with the values of the Banakh space X. This operator is thus defined for functions which are assumed by the equation

 $\varphi(\vec{P}) = \int_{i}^{\infty} \vec{P} \, \partial E_{i}$ 

In that connection the f signify certain elements of X and the quantities  $E_{i}$  - signify in the sense of Lebesgue measurable

Card 1/2

SOBOLEV, S. L. and LYAFUHOV, A. A.

"Cybernetics and Natural Science," <u>Voprosy filosofii</u> Problems of Philosophy, 1958, No. 5, Pages 127 - 138.

VISHIK, M.I.; SOROLEV, S.L., akademik.

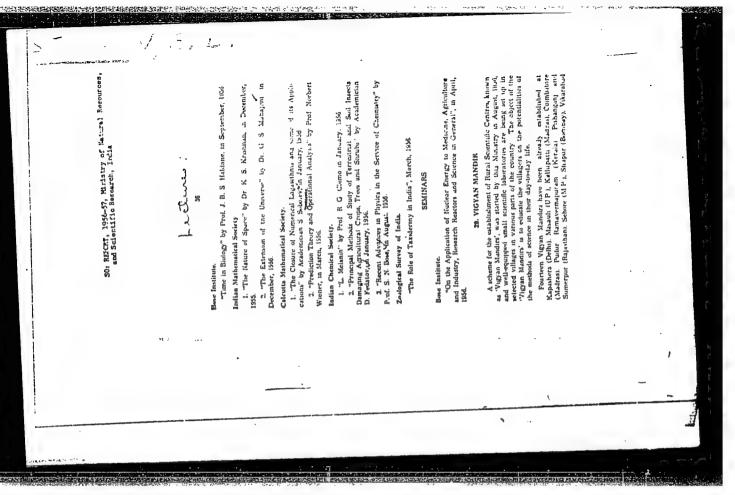
General formulation of certain boundary problems for elliptical differential equations with partial derivatives.

Dokl. AN SSSR 111 no.3:521-523 N '56.

(Differential equations, Partial) (Functional analysis)

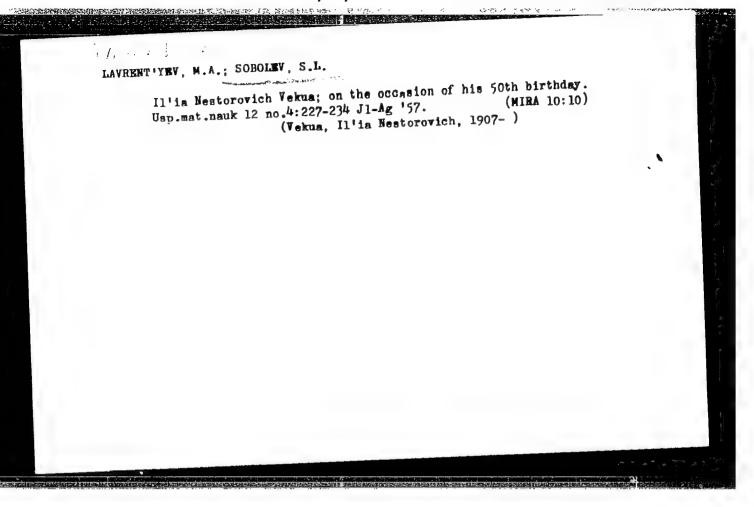
"APPROVED FOR RELEASE: 08/25/2000

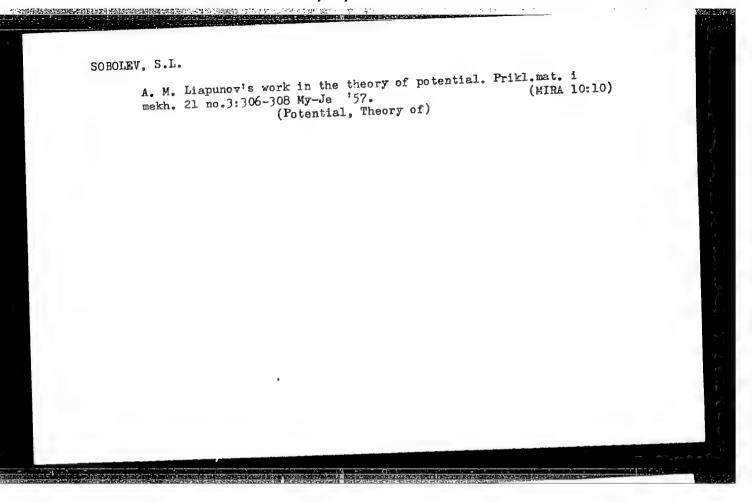
CIA-RDP86-00513R001651820017-0



SOBOLEV, J. L. and LYAFUNOV, A. A.

Kibernetika i estestvoznaniye / Cybernetics and Natural Science, Publishing House of the Academy of Sciences USSR, 1957, 26 pages. (Material for the All-Union Conference on Philosophical Problems of Natural Science).





# "APPROVED FOR RELEASE: 08/25/2000

CIA-RDP86-00513R001651820017-0

IJP(C) 5/0020/63/150/006/1238/1241 EWT(d)/FCC(w)/BDS L 12833-63 ACCESSION NR: AP3003216

AUTHOR: Sobolev, S. L. (Academician)

TITLE: Application of computation factor to formulas of mechanical volumes

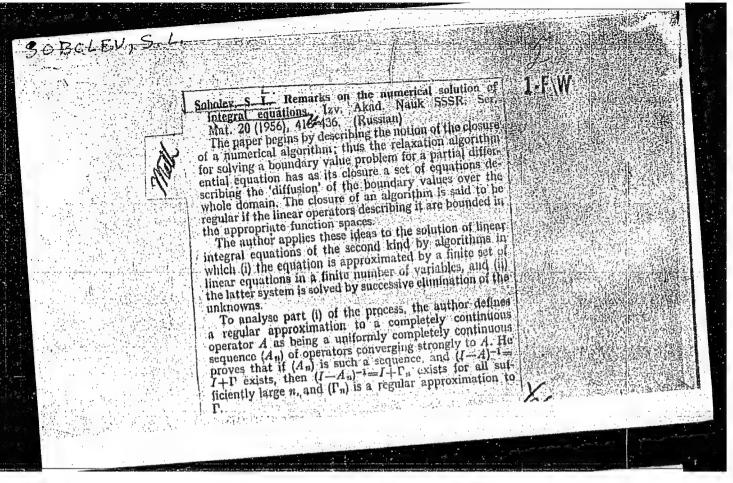
SOURCE: AN SSR Doklady, v. 150, no. 6, 1963, 1236-1241

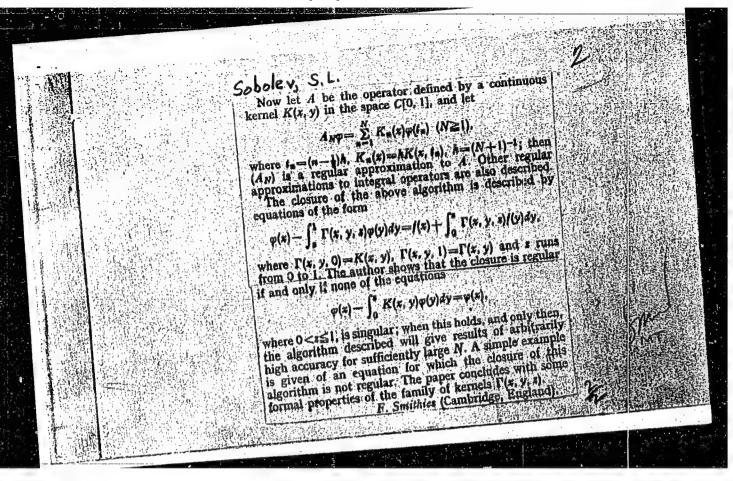
TOPIC TAGS: computation factor, mechanical volume, Fourier representation, Dirac function, degree of polynomial, polynomial

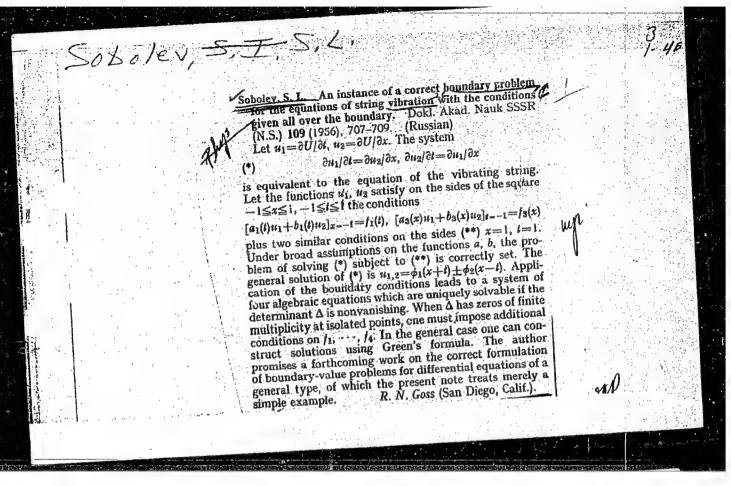
ABSTRACT: The problem is to determine the coefficients of equation (1) of the ABSTRACT: The problem is to determine the coefficients of equation (2) of the Enclosure such that the functional l(x), defined by equation (2) of the Enclosure vanishes on all polynomials of degree m-l. For a finite case, a necessary and sufficient condition that l(x) vanishes on all polynomials of degree m-l is that its Fourier representation should have a root of order m at the origin. An analogous theorem is given in the case of unbounded regions. Orig. art. has: 6 formulas.

Association: Inst. of Mathematics with Computer Center, Siberian Division

Card 1/1/







(Prof.) SOBOLEV, S. L. (Acad.) and LYAPUNOV, A. A.

"Cybernetics and the Natural Sciences."

report presented at All-Union Conference on Philosophical Questions of the Natural Sciences. Moscow Scientists Club, 22 Oct 58

CIA-RDP86-00513R001651820017-0" APPROVED FOR RELEASE: 08/25/2000

SOV/20-121-4.7 \$4

Remarks on the Criterion of Petrovskiy of the Uniform Co. 1927 ness of Cauchy's Problem for Partial Differential Equations (Zamechaniya o kriterii Petrcyskogo ravnomerncy korrektnos: AUTHOR: TITLE:

zadachi Koshi dlya uravneriy v chastnykh proizvodnykh)

Doklady Akademii neuk SSSR,1958, Vol 121, Nr 4, pp 598-601 (JSSR)

PERIODICAL:

Let the Cauchy problem ABSTRACT:

Let the Cauchy problem
$$(1) = \frac{\partial^n u}{\partial t^n} + \sum_{k < n} \frac{\partial^k u}{\partial t^k \partial x^k} = F$$

(2) 
$$u \mid_{t=0} = \frac{\partial u}{\partial t} \mid_{t=0} = \cdots = \frac{\partial^{n-1} u}{\partial t^{n-1}} \mid_{t=0} = 0$$

be given. In order that (1) - (2) possesses a solution in an be given. in order that (1) to possess on the constants Akl infinite domain continuously depending on the constants Akl and on the right side F, according to Petrovskiy, it is necessary and sufficient that for purely imaginary & the equation

gard 1/4

SOV/20-121-4-7/54 Remarks on the Criterion of Petrovskiy of the Uniform Correctness of Cauchy's Problem for Partial Differential Equations

f Cauchy's Problem for 1  
(3) 
$$\triangle (\lambda, \alpha) = \lambda^n + \sum_{k < n} A_{kl} \lambda^k \alpha^l = 0$$

possesses only roots which lie on the left of a certain straight line 6>0', where  $\lambda=6'+$  it. In this case L is called an operator of Petrovskiy. The operator

(4) Lu = 
$$\left(\frac{\partial}{\partial t} - A \frac{\partial^{m}}{\partial x}\right)$$
u

is called an elementary operator of Petrovskiy. If m is even and  $\left| \arg \left[ \left( -1 \right)^{k+1} A \right] \right| < \frac{\widetilde{\nu}}{2}$ , then (4) is called strongly  $\left| \arg \left[ \left( -1 \right)^{k+1} A \right] \right| = \frac{7}{2}$ , then (4) is bolic. If m is odd or

called semihyperbolic.

Theorem: The operator Lu =  $\left(\frac{\partial^n}{\partial t^n} - B \frac{\partial^p}{\partial x^p}\right)^n$  is an operator

card 2/4

Remarks on the Criterion of Petrovskiy of the Uniform SOV/20-121-4-7/54Correctness of Cauchy's Problem for Partial Differential Equations of Petrovskiy if and only if n=2, p=2m and if the factors

$$\frac{3t}{3} + \sqrt{B} \frac{3^{x_m}}{3_m}$$

are semihyperbolic operators of Petrovskiy.

Theorem: Every operator of Petrovskiy is representable as a product of elementary operators of Petrovskiy:

Lu = 
$$\prod_{s=1}^{n} \left( \frac{\partial}{\partial t} - A_s \frac{\partial}{\partial x} \right)^{u} + L_2 u$$
,

where  $L_2^{\rm u}$  contains the terms of lower order. By the expansion of the root  $\lambda$  of (3) in terms of powers of  $\alpha$ 

$$\lambda = A_0 \propto^m + A_1 \propto^{m-\frac{1}{8}} + \cdots + A_m + \cdots$$

Card 3/ 4

Remarks on the Criterion of Petrovskiy of the Uniform SOV/20-121-4-7/54 Correctness of Cauchy's Problem for Partial Differential Equations

and formation of symmetric functions from the conjugate roots (i.e. from those which arise by the sustitution

certain canonical operators of Petrovskiy. It is shown that every operator of Petrovskiy differs only by unessential terms from a product of canonical operators.

There is 1 Soviet reference.

SUBMITTED: April 19, 1958

Card 4/4

# "APPROVED FOR RELEASE: 08/25/2000

# CIA-RDP86-00513R001651820017-0

sov/89-5-2-15/36 Sobolev, S. L., Mukhina, G. V.

The Determination of Thermal Stresses in a Medium Containing AUTHORS:

Cavities (Opredeleniye termicheskikh napryazheniy v srede s TITLE:

Atomnaya energiya, 1958, Vol. 5, Nr 2, pp. 178-181 (USSR)

When calculating some types of fuel elements it is essential to PERIODICAL: ABSTRACT:

A body with a uniformly distributed heat emission Q with respect solve the following mathematical problems: to its entire volume exists. The body is subdivided by cylindrical channels which have circular cross sections the axes of which are parallel to one another. Heat removal takes place only by the surface of the channels and the surface temperature is constant and equal in all channels. The body is able to expand freely in all directions. The demand is made to find the maximum dilatation-, compression- and shearing stresses in the body under the following

1.) No exterior forces act upon the body and it is influenced only

2.) The maximum drop in temperature in the body is not high and the material properties of the body do not change within this

Card 1/3

The Determination of Thermal Stresses in a Medium Containing Cavities

SOV/89-5-2-15/36

range of temperature.

3.) All stresses produced in the material of the body in no case exceed the limits of the elastic deformations and the properties of the material are isotropic in all directions. The problem of calculating the elastic stresses is carried out by means of the variation method according to Ritz. By the introduction of the function according to "Eri" (Airy?) the problem is reduced to the determination of a maximum of the integral:

when using this method the selection of the most suitable system of the function on which the approximated solution is based is of essential importance. It is shown that the function according to "Eri" is suitable for the solution of the problem in question. A simple method is given for the determination of the approximated solution. There are 5 figures.

Card 2/3

AUTHOR:

Sobolev, S.L., Academician

SOV/20-122-4-4/57

TITLE:

On Mixed Problems for Partial Differential Equations With Two Independent Variables (O smeshannykh zadachakh dlya uravneniy v chastnykh proizvodnykh s dvumya nezavisimymi peremennymi)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 4, pp 555-558 (USSR)

The equation with constant coefficients ABSTRACT:

(1) 
$$\frac{\partial^{n} u}{\partial t^{n}} + \sum_{k < n, 1 \le m} {}^{A}k, 1 \quad \frac{\partial^{k+1} u}{\partial t^{k} \partial x^{1}} = f$$

already considered by the author in [Ref 1] is investigated in the domains

the domains 
$$0 \le t \le +\infty$$

the domains
$$0 \le t < + \infty$$

$$0 \le t < + \infty$$

$$0 \le t < + \infty$$

Initial conditions are :

Card 1/3

sov/20-122-4-4/57 On Mixed Problems for Partial Differential Equations With Two Independent Variables

$$u \Big|_{t=0} = \frac{\partial u}{\partial t} \Big|_{t=0} = \cdots = \frac{\partial^{n-1} u}{\partial t^{n-1}} \Big|_{t=0} = 0$$

boundary conditions are

$$\frac{\sum_{i=1}^{m-1} g(s)}{\sum_{i=1}^{n} g(s)} \frac{\partial^{i} u}{\partial x^{i}} \Big|_{x=0} = 0 , s = 1, 2, \dots, q_{-}, \text{ in the cases } D_{2} \text{ and } D_{3}$$

and 
$$\sum_{i=1}^{m-1} h_i^{(s)} \frac{\partial^i u}{\partial x^i}\Big|_{x=1} = 0$$
,  $s = 1, 2, \dots, q_+$  in the case  $D_3$ . The

solution is sought with the aid of the Laplace transformation.

Let 
$$\triangle(\lambda, \lambda) = \lambda^n + \sum_{k < n, 1 \le m} A_{k, 1}^{k} \lambda^k \lambda^1$$
 furthermore let  $r_{-}$ 

be the number of the roots of the equation  $\Delta(\lambda, \star)$  = 0 lying in the left semiplane and r the number of the roots in the Theorem: The problem is in general solvable in  ${\tt D}_2$  and possesses

Card 2/3

On Mixed Problems for Partial Differential Equations SOV/20-122-4-4/57 With Two Independent Variables

a unique solution, if  $q_{\underline{\ }}=r_{\underline{\ }}$ . In particular, it is solvable, if the boundary conditions have the form

$$\frac{\partial^k k}{\partial x^k}\Big|_{x=0} = 0$$
 ,  $k = 0,1,\ldots,r$ 

Theorem: The problem is in general solvable in D<sub>3</sub>, the solution is unique, if q = r and  $q_+ = r_+$ .

There are 2 Soviet references.

SUBMITTED: July 17, 1958

Card 3/3

# "APPROVED FOR RELEASE: 08/25/2000

# CIA-RDP86-00513R001651820017-0

PRIME I ENKIRTLITATION SOV 3993  Tisostatio publish sortestorial words yestestorianily statistically publish sortestorial words yestestorianily statistics of sharing this publish sortestorial words are statistically sovered to this source in this source was some this source with the source words with the source was source with this source was source with the source was source was source was source with the source was	THE CANADA SECTION OF
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sov/42-14-2-14/19 Oleynik, O.A., and Sobolev, S.L. 16(1)

Partial Differential Equations at the International Congress in AUTHORS:

TITLE:

PERIODICAL: Uspekhi matematicheskikh nauk, 1959, Vol 14, Nr 2, pp 247-250 (USSR)

This is a report on the deliveries and opinions of western mathematician. on the subject of "pertial differential equations". ABSTRACT:

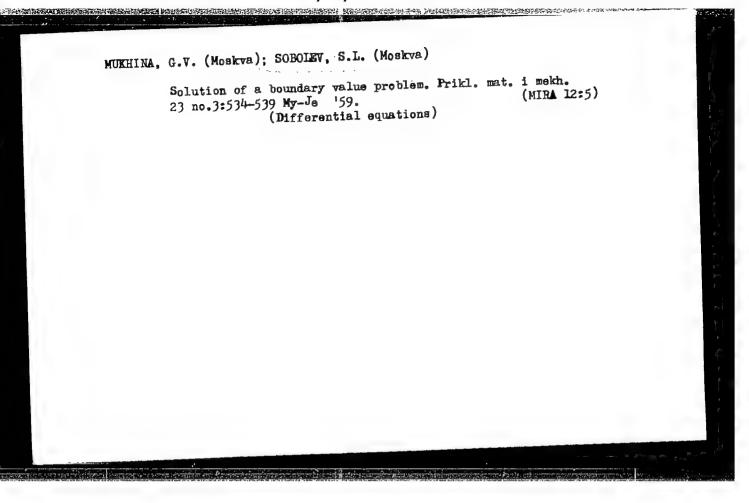
Soviet deliveries are not mentioned. Incidentally the authors mention I.G. Fetrovskiy, A.D. Eyshkis, M.I. Vishik, Landis, and

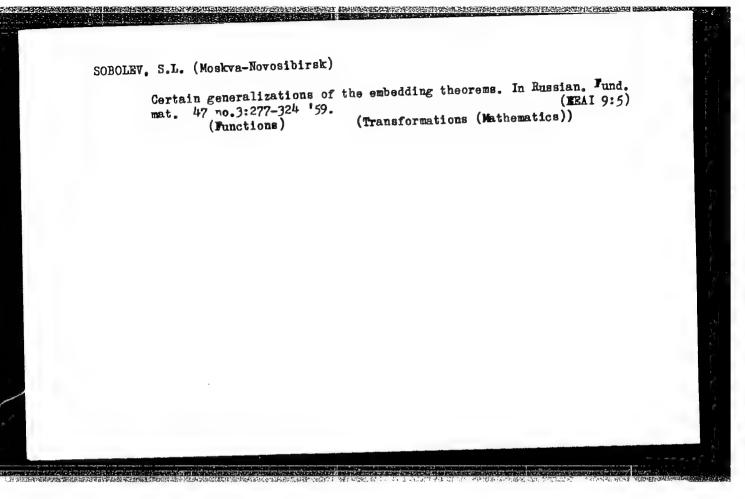
: 3

Pliss.

Card 1/1

CIA-RDP86-00513R001651820017-0" APPROVED FOR RELEASE: 08/25/2000





16(1) 16,3500 AUTHOR: Sobol

68150 SOV/20-129-6-13/69

Sobolev, S.L., Academician

TITLE:

The Fundamental Solution of Cauchy's Problem for the Equation  $\frac{\partial^3 \mathbf{u}}{\partial x \partial y \partial z} - \frac{1}{4} \frac{\partial \mathbf{u}}{\partial t} = \mathbf{F}(\mathbf{x}, \mathbf{y}, z, t)$ 

Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 6, pp 1246-1249(USSR)

PERIODICAL: ABSTRACT:

The author obtains the solution of the equation

 $\frac{\partial^{3}G}{\partial x \partial y \partial z} - \frac{1}{4} \frac{\partial G}{\partial t} = S(x, y, z, t)$ 

which vanishes for t<0. Let

(3)  $G(x, \beta y, \chi z, \lambda \beta \chi t) = \frac{1}{\lambda \beta \chi} G(x, y, z, t) = \Psi(x, y, z, t) = \frac{1}{\lambda \beta \chi}$ 

From (2) it follows  $\psi = 0$ , so that it is

(4)  $G(xx, By, yz, AB,t) = \frac{1}{ABy} G(x,y,z,t)$ 

From this there follows the possibility of the representation

Card 1/3

The Fundamental Solution of Cauchy's Problem for

SOV/20-129-6-13/69

68150

the Equation  $\frac{3^3 u}{3x^3y^3z} - \frac{1}{4} \frac{3u}{3t} = F(x,y,z,t)$ 

(5)  $G = \frac{1}{t} \Lambda \left( \frac{xyz}{t} \right)$ 

If (5) is substituted into (2), then for the determination of

 $\Lambda$  ( $\xi$ ), where  $\xi = \frac{xyz}{t}$ , the author obtains

(6)  $\left(\xi \frac{d}{d\xi} + 1\right) \left(\xi \frac{d^2}{d\xi^2} + \frac{d}{d\xi} + \frac{1}{4}\right)^{\frac{1}{2}} = 0$ 

The equation (6) is integrable in Bessel functions, so that for  $\xi > 0$  there holds e.g.

(7)  $A_1(\xi) = c_1^{(1)} I_o(\sqrt{\xi}) + c_2^{(1)} Y_o(\sqrt{\xi}) + c_3^{(1)} \int_0^1 I_o(\xi) Y_o(\xi) - \xi$ 

Card 2/3

The Fundamental Solution of Cauchy's Problem for

50V/20-129-6-13/69

the Equation  $\frac{\partial^3 u}{\partial x \partial y \partial z} - \frac{1}{4} \frac{\partial u}{\partial t} = F(x,y,z,t)$ 

Now the author shows by direct examination that the fundamental solution of the title equation and the solution G of (2) respectively have the form :

(8) 
$$G(x,y,z,t) = \begin{cases} = 0 & \text{for } t < 0 \\ -\frac{1}{2\sqrt{n}} \frac{1}{t} Y_0 \left(\sqrt{\frac{xyz}{t}}\right) & \text{for } t > 0, & xyz > 0 \end{cases}$$

$$\frac{1}{\sqrt{2}} \cdot \frac{1}{t} K_0 \left(\sqrt{\frac{-xyz}{-t}}\right) & \text{for } t > 0, & xyz < 0 \end{cases}$$
The particular of C. Potrovskiy, — There is 1 Soviet

The author mentions I.G. Petrovskiy. - There is 1 Soviet reference.

ASSOCIATION: Institut matematiki Sibirskogo otdeliniya Akademii nauk SSSR

(Institute of Mathematics of the Siberian Department AS USSR) September 17, 1959

SUBMITTED:

Card 3/3

SOBOLEV, S. L.

"O formulah mekhaniceskih kvadratur;"

Report submitted for the Conference on Functional Analysis,
Warsaw, 4-10 Sep 60

SOBOLEV, S.L. (Novosibirsk)

Motion of a symmetrical gyroscope having a cavity filled with a liquid. PMTF no.3:20-55 S-0 '60. (MIRA Li.:7)

(Gyroscope)

S/030/60/000/010/002/018 B021/B058

AUTHORS:

Lyusternik, L. A., Corresponding Member AS USSR,

Sobolev, S. L., Academician

TITLE:

Problems of Computer Mathematics

PERIODICAL:

Vestnik Akademii nauk SSSR, 1960, No. 10, pp. 23-31

TEXT: The authors endeavor to establish only some characteristic trends in the development of computer mathematics. The ever increasing fields of application of mathematics and of problems to be solved led to a great increase of the volume and variety of computations. Special computer installations were necessary therefore. The development of new means of computation techniques was of great influence on computer mathematics, requiring the training of operating personnel. Courses for laboratory assistants, computer operators and programmers are held in a number of organizations in Moscow and Novosibirsk. The first schools with a computer-mathematics trend have been established in Moscow. Statistical data on the Vychislitel'nyy tsentr Moskovskogo universiteta (Computer Center of Moscow University) are given next. The Center had a "Strela" electronic

Card 1/3